Facility Improvements

Most of the dams, canals, and other infrastructure in the Mid-Pacific Region's projects are decades old. Keeping them in good working order and ensuring they will withstand future earthquakes common to California is an ongoing process. Following is a look at progress made in 2002 toward those ends.

Top, the new "A'"Canal headgates take shape in late 2002. Above, construction of the new fish screen getting under way.

"A" Canal Fish Screen Project (2)

Work began in August 2002 on the construction of the "A" Canal Fish Screen and associated facilities in the Klamath Project. The $11 million project's purpose is to reduce entrainment of larval, juvenile, and adult endangered Lost River suckers and shortnose suckers from Upper Klamath Lake into the "A" Canal, while still providing water to area farmers.

The U.S. Fish and Wildlife Service first identified the need to reduce entrainment in its1992 long-term Biological Opinion on the operation of the Klamath Project. The current Biological Opinion for suckers requires that an operational screen be constructed before diversions begin on April 1, 2003. The "A" Canal was the largest unscreened diversion facility in Oregon.

After groundbreaking on phase one of the "A" Canal Fish Screen Project began in August, the historic, turn-of-the-century headworks (parts of which will be preserved and displayed in a Klamath Falls museum) were removed in October. Primary project elements – including headgates, trashrack, fish screen, pump station, fish evaluation station and preliminary bypass – were to have become operational in April 2003 in time for the beginning of the irrigation season.

The Project's Phase Two will immediately follow, including the installation of a secondary bypass pipe to the lower Link River as well as final features such as paving, lighting, area restoration, and landscaping. The entire project is slated for completion in August 2003.

The project site was at the center of controversy and garnered national media attention in 2001 when public protests surrounding water allocation and endangered species took place.

For additional information, contact the Klamath Basin Area Office at 541-883-6935 (TDD 541-883-6935).

Clear Lake Dam Reconstruction

Reconstruction of Clear Lake Dam under way in late 2002.

Clear Lake Dam, a zoned earth and rock-filled embankment located in Modoc County, California, was constructed in 1910 and raised 3 feet in 1938.

The $6.2 million contract for reconstruction of Clear Lake Dam was substantially completed in mid-November 2002 using Safety of Dams (SOD) authority. The original dam did not meet today's safety standards and had to be reconstructed.

In 1997, Reclamation's SOD program determined that the dam did not meet state of the art design standards and that the structure was susceptible to seepage, piping, internal erosion, and foundation liquefaction during large earthquakes.

The modification includes a roller-compacted concrete dam founded on bedrock and new outlet works with slide gates and fish screens. Fish screens, while not part of the SOD program, were constructed to prevent the movement of endangered fish out of the reservoir.

The reservoir provides irrigation water to 11,000 acres in Langell Valley and to the Horsefly Irrigation District, prevents flooding historic Tule Lake, and makes possible another 17,500 acres of otherwise non-productive land available to irrigators. The spillway was rehabilitated in 1974.

For more information, contact the MP Construction Office at 530-934-7066 (TDD 530-934-1345).

Coleman National Fish Hatchery

The Central Valley Project Improvement Act required the rehabilitation and expansion of the Coleman National Fish Hatchery on Battle Creek in northern California's Shasta County to be an ongoing process. Although it is 58 years old, the hatchery is a large, modern, state-of-the-art facility with rebuilt raceways and state-of-the-art water treatment facilities. It meets its production goals as described in the U.S. Fish and Wildlife Service's 1998 Biological Assessment, and facility upgrades and improvements continue as planned.

The following station development projects are ongoing:

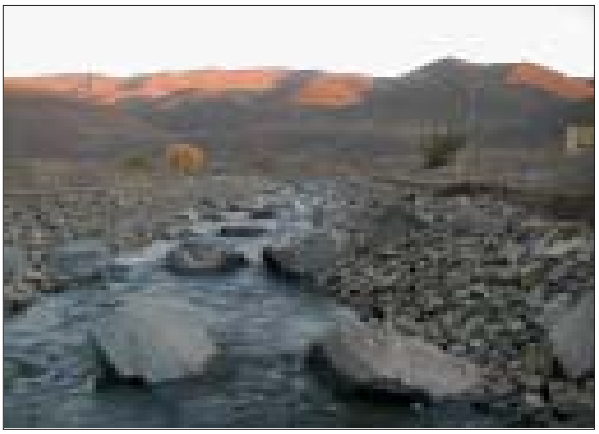
- A seismic retrofit of the hatchery building to meet California Zone 2 seismic requirements
- A contract to provide detailed station piping and valving drawings to facilitate facility operations, and
- National Environmental Policy Act initial and advanced design development for the water intake modification project.

Simultaneously, coordination is ongoing to ensure the hatchery is compatible with the restoration of Battle Creek, potentially the best salmon spawning tributary north of the Feather River, and the stream from which the hatchery obtains its water.

For additional information, contact the Northern California Area Office at 530-275-1554 (TDD 530-275-8991).

Water Fact

Battle Creek, a tributary of the Sacramento River in Northern California, is potentially the best salmon spawning tributary north of the Feather River.



Derby Dam's new fish passage neared completion in late 2002.

Derby Diversion Dam Fish Passage Project

Derby Diversion Dam, located on the Truckee River 20 miles east of Reno, Nevada, was Reclamation's first construction project and was completed in 1905. The dam diverts water from the Truckee River into the Truckee Canal and is used to irrigate agricultural land and wetlands in the Newlands Project. The construction of Derby Dam resulted in blocking fish from migrating upstream in the Truckee River for almost 100 years.

To address the fish passage problem at Derby Dam, the Lahontan Basin Area Office began construction of a fishway in 2002. At the end of the year, the project was near completion. The fishway provides access to fish spawning and rearing habitat upstream of Derby Dam and also facilitates downstream fish migration. It provides benefits to resident and migratory fish, including the federally listed cui-ui and Lahontan cutthroat trout by reconnecting a currently fragmented river system.

The fish passage is a state-of-the-art rock channel fishway designed by Reclamation's Denver Technical Service Center. The passage is 930 feet long with an elevation gain of 15 feet and was designed with a very gentle slope to allow weaker swimming fish species to successfully navigate the passage and move upstream. Large "tuning" boulders are located in the rock channel to slow the water velocity to provide resting areas for migrating fish in the 66 successive ponds of the fishway.

In addition to the fishway, part of the project included automation of the gates on the dam and construction of a flood bypass structure.

For additional information, contact the Lahontan Basin Area Office at 775-882-3436 (TDD 775-882-3436).

Construction crews work with a section of the Folsom Dam Temperature Control Device.

Folsom Dam Temperature Control Device

A construction contract was awarded in 2002 to C&W Diving of National City, CA, to install a Temperature Control Device (TCD) on the urban water supply intake on Folsom Dam. Once operational, the TCD will allow for the conservation of cold water in Folsom Lake. The colder water will be released down the Lower American River during the hot summer and early fall months to help steelhead and salmon survival.

Folsom Dam and Lake provides water storage, flood control, water quality, fish and wildlife, and recreation benefits. The dam delivers urban water to nearby cities and water districts and provides downstream water quality benefits. Water released from the dam forms the flow of the Lower American River in which threatened fish live.

During the high demand summer months, water can only be drawn from the depths of Folsom Lake, which, due to temperature stratification, contains a limited pool of colder water. Ideally, the temperature of the Lower American River should remain below 67 degrees F at a compliance point located downstream at Watt

Avenue during the summer for steelhead. A temperature of 60 degrees F or lower is needed for fall run Chinook salmon during the fall months.

TCD fabrication took place in 2002, installation was scheduled to begin in late-February 2003, and it is expected to be completed and operational by late summer 2003. The contractor will assemble the TCD, install the unit on the upstream side of the dam, as well as install the ancillary equipment to control the TCD.

Project beneficiaries also include urban users that draw water from the lake through the intake pipe. Those users — the City of Folsom, Folsom State Prison, San Juan Water District, and the City of Roseville — will be able to get more dependable and constant water deliveries without limitations caused by the American River temperature requirement.

For additional information, please contact the Central California Area Office at 916-988-1707 (TDD 916-989-7285).

Folsom Power Generator Overhauls

The Folsom Powerplant's three power-generating units are in the process of undergoing overhaul to make them more reliable.

Unit 3's overhaul was completed as scheduled in May 2002. From October 1999 through May 2000, Unit 2 underwent overhaul. Unit 1 came off line in October 2002, and the entire program will be completed by May 2003.

The process for each unit involves major disassembly from top to bottom. In addition, some modifications are being made to employ newer technology to make the units operate more reliably and with less maintenance.

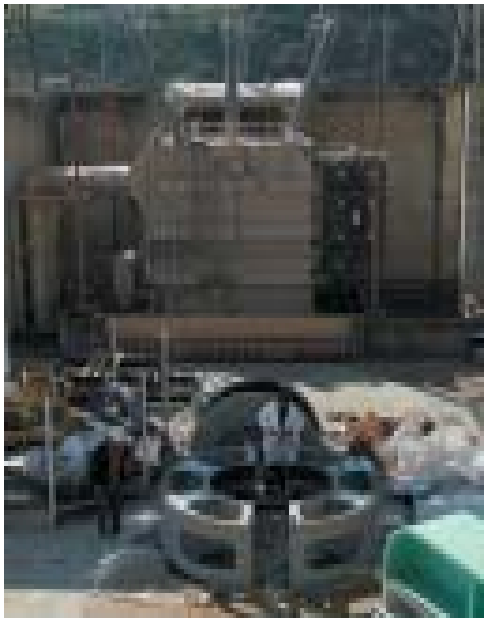
One of the modifications involves removing the automatic greasing system and installing self-lubricating bushings that require no maintenance. Digital state-of-the-art governors are also being installed to better regulate unit speed. The old governor system required maintenance, and the systems are now so old that there are no replacement parts available.

On Unit 1, a 'Powerformer,' a trademark name for a high-voltage generator, is scheduled to be the first installation of its kind in the country. With a contract expected to be awarded in February 2003, it would be installed starting in October 2003 and scheduled for completion by May 2004.

The major part of the work involves replacing conventional copper buss bars used for stator windings with high voltage cable, which is designed to carry transmission line voltages. Winding a generator eliminates the unit transformer, and its elimination improves system reliability, reduces maintenance costs, and eliminates possible environmental risk if a transformer failure occurred.

Most of the unit overhaul work is being done by contractors, and the cost varies from $2.5 – $3.5 million per unit based on the modifications being made. Funding comes from the RAX program (Extraordinary Repairs and Alterations). The power users have agreed to fund the high voltage generator conversion project on Unit 1. The total amount of costs for the 'Powerformer' project is expected to be between $7 and 9 million.

For additional information, call the Central California Area Office at 916-988-1707 (TDD 916-989-7285).



Work under way at Folsom Powerplant.

New Melones Powerplant Protective Relay Replacements

The new design replaces the existing system with two independent systems for redundancy.

Existing electro-mechanical relays, which have been in service since the plant was commissioned in 1979, are being replaced at the New Melones Powerplant. The new protective relay packages are solid-state protection packages which also collect and store information about the system whenever a disturbance takes place. The new design replaces the existing system with two completely independent systems for redundancy and reduces any possibility of a unit not being protected during a fault on the system.

Powerplant Unit 2 was scheduled to receive the new protection system starting in February 2003, and is scheduled to be completed by March 2003. Unit 1 work is scheduled for March 2003 and is scheduled for completion in May 2003.

For additional information, contact the Central California Area Office at 916-988-1707 (TDD 916-989-7285).

Replacements, Additions, and Extraordinary (RAX) Maintenance and Deferred Maintenance

The CVP RAX Program had a budget of $11 million in Fiscal Year 2002 and is one of the largest budgetary items in the Mid-Pacific Region. The entire CVP RAX budget was successfully expended by the end of the fiscal year. Some of the projects completed include the overhaul of Folsom Powerplant Unit #3, replacing Shasta Powerplant Switchyard 230-kilovolt disconnects, refurbishing the main unit transformers at Shasta Powerplant, and replacing underrated battery chargers and station batteries at five major powerplants in the CVP.

CVP RAX consists of approximately 175 items. The CVP RAX Program has consistently assured that all available dollars are applied to the highest priority items first. To date, the Region has successfully managed the CVP RAX budget in a manner to sustain its aging infrastructure.

For additional information, contact the Division of Resources Management at 916-978-5200 (TDD 916-978-5608).

Water Fact

The Shasta Drum Gate contract, worth $3.4 million, involved repairing drum gate seals on Shasta Dam's three 100-foot drum gates and painting and refurbishing the gates in the process.

Shasta Drum Gate Rehabilitation

Shasta Dam's drum gates were given a major rehabilitation starting in the summer of 2001 and were scheduled for completion in January 2003.

In the summer of 2001 when the lake began to drop and the drum gates began to float down, a series of supports were placed under the downstream lip of the drums, holding them up for work. The lake continued down on its normal cycle, but the drums remained supported so rehabilitation work could be done outside as well as inside the float chamber.

The exterior downstream skin was stripped of paint, rust spots were welded up, and the skin was primed and painted. The end, bottom, and upstream skin surfaces

were also repainted. All seals, drain hoses, and hardware were replaced. The hinge pins were exposed and tested for cracks; none were found. This was a $3.4 million job, making the drum gates as good as new.

For additional information, contact the Northern California Area Office at 530-275-1554 (TDD 530-275-8991).

Shasta Turbine Upgrade

In 2002 the on-site work of the multi-year turbine upgrade job at Shasta Powerplant got started. The first set of new parts was delivered in August 2002. From early October until mid-November, Shasta's Unit 4 generator and turbine were disassembled. By year's end, some major items accomplished included: the head cover was cleaned, painted, and reinstalled; the shaft was removed from the old runner and installed on the new runner; and the old seal rings were removed and a new upper seal ring was installed. The old wicket gate levers were sent to Alstom Manufacturing in Montreal, Canada, for fitting to the new wicket gates. The first generator is scheduled to be back in service in June 2003.

This multi-year turbine upgrade job is an ambitious project that will result in five new and better turbines, coupled to five refurbished generators at Shasta. The five new units, rated at 142 megawatts (Mw) each, will be a significant upgrade from the present 125 Mw, without the addition of a new generator or using more water from the lake. It is an example of using today's best technology and tools to improve key parts of a powerplant for an overall power increase. The increased power output comes from: (1) better hydrologic data from which to design the new turbines, and (2) better modeling, materials, and manufacturing techniques.

Mostly Shasta Dam mechanical crews are performing the on-site work. There are now a few workers on the crews with experience in a total overhaul. At the end of the 5-unit upgrade, which will be 5 or more years in the future, there will be a crew of experts. In addition to getting new turbine parts, people's expertise is being improved.

For additional information, contact the Northern California Area Office at 530-275-1554 (TDD 530-275-8991).

Delivery of the first new runner for Shasta Powerplant. Located at the base of the Shasta Unit 4 60-foot tall turbine generator unit, it weighs 50 tons. Once complete, the unit will generate 142 megawatts. It will be assembled and running in late June 2003.